中華民國專利公報 (19)(12)

(11)公告編號：146773

(45)中華民國79年(1990)12月01日

發明

4/6

(51)Int.Cl.：A61M

全3頁

(54)名稱：一次使用之注射器

(21)申請案號：79100210　(22)申請日期：中華民國79年(1990)01月12日

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(57)申請專利範圍：

1.一種一次使用之注射器，包含：一管形體(2)一柱塞(3)可在密封關係中滑動於其中；一針(12)，安裝於管形體中在其第一軸向末端(2a)處，並可移動於一第一安全位置及一第二工作位置之間，在此等位置中，針分別縮回及伸出形體(2)通過只一開口(8)；一彈簧(22)，朝縮回位置偏壓該針(12)，該針暫時鎖定於其工作位置上；其特徵爲該注射器包含：一可撓張保持構件(15)，連接於針(12)之延伸於管形體內之一端；至少一突階(11)，構設於管形體中，在距第一端(2a)一固定距離處，因此，當針自第一移至第二位置時，保持構件移過該突階；保持構件之一撓張裝置(7)，以可移去式裝置於柱塞(3)上，並適於納進及保持保持構件(15)之一第一插座(18)俾於通過突階(11)後撓張保持構件，並保持針於工作位置，保持構件抵壓於突階上；及解脫裝置(5,6)，於柱塞之工作衝程完成後，該裝置使撓張裝置脫離第一插座，俾使保持構件脫離突階，並永開針，使其回至第一位置。

2.如申請專利範圍第1項所述之注射器，其中該保持構件(15)包含一短頭(16)，該短頭開口向柱塞(3)，並具有第一插座(18)及一第二插座(19)形成於其中，第二插座之狀形設計在容納脫離第一插座時之撓張裝置(7)，並容許保持構件彈性退回。

3.如申請專利範圍第2項所述之注射器，其中該短頭構設有縱切口(17)。

4.如以上申請專利範圍第1項所述之注射器，其中保持構件之撓張裝置包含一環(7)，以可移去式保持於柱塞栓(5)上。

5.如以上申請專利範圍第4項所述之注射器，其用以自第一插座(18)中解脫撓張裝置之該裝置(5,6)包含該柱塞栓。

6.如申請專利範圍第4項所述之注射器，其中，該栓(5)具有大致圓筒形狀，並設有一環形隆起緣(6)，適於留住該環(7)，直至其納於第一插座(18)中爲止，且滑革此形成撓張裝置之解脫裝置。

7.如以上申請專利範圍第1項所述之注射器，其中設置一針引導構件(25,30)，可被推進接合並保持於管形體(2)之第一端(2a)處所構設之一插座(9)中。

8.如申請專利範圍第7項所述之注射器，其中該彈簧(22)爲螺旋彈簧，及該針引導構件(25,30)，在插進對座之插座(9)之前，保持於彈簧之螺旋圈中，從而使針對準管形體之第一端之開口(8)。

9.如申請專利範圍第7項所述之注射器，其中針引導構件(30)在其面對保持構件(15)

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之面上有一凹進橢圓形狀(32)。

10. 如以上申請專利範圍第1項所述之注射器，其中在柱塞(3)之工作衝程後，在其縮回管形體(2)內之該針(12)偏離管形體(2)之開口(8)。

11. 如申請專利範圍第7，8或9項所述之注射器，其中在柱塞(3)之工作衝程後，在其縮回管形體(2)內之該針(12)脫離針引導構件(25, 30)，並偏離管形體之開口(9)。

12. 如申請專利範圍第1項所述之注射器，其中該保持構件(15)接合於管形體(2)中，與其成密封關係。

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13. 如以上申請專利範圍第4，5或6項所述之注射器，其中該柄(5)與柱塞(3)之一活塞(4)爲一體構造。

14. 如申請專利範圍第7，8或9項所述之注射器，其中，該保持構件包含一頭部(20)，該頭部適於推動針引導構件(25, 30)進入對應插座(9)中，同時針(12)在其第二位置中。

圖示簡單說明：

圖1至5爲本發明具體之注射器之部份斷面圖。

圖6爲前圖所示之注射器之一組設修改之具體實例之縱斷面圖。

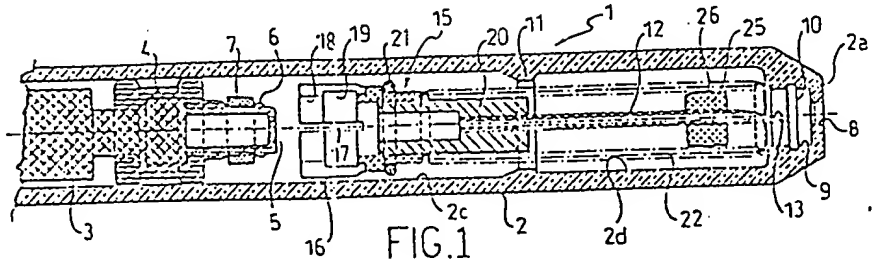

FIG.1

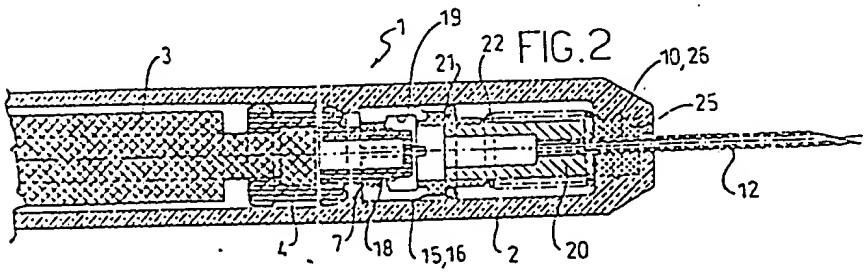

FIG.2

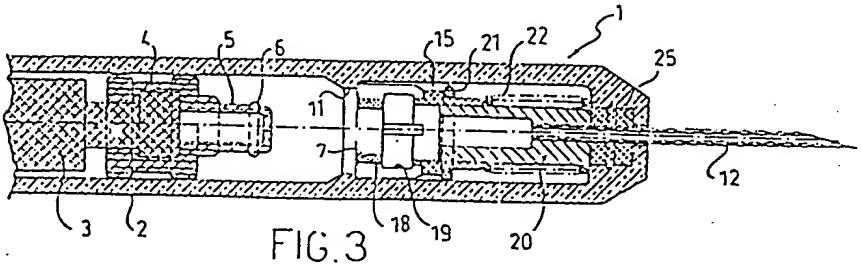

FIG.3

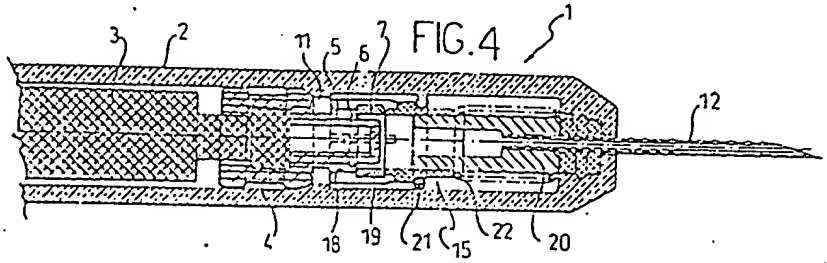

FIG.4

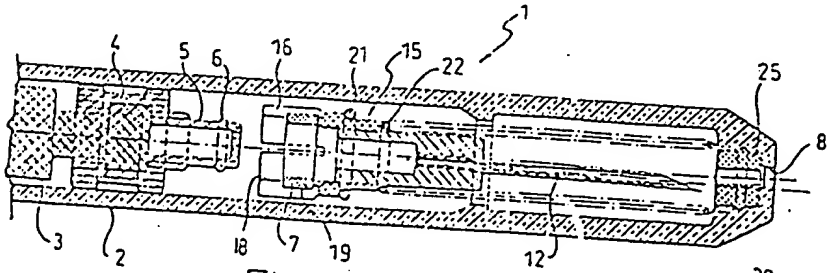

FIG.5

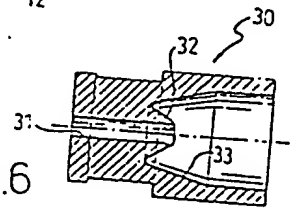

FIG.6

DESCRIPTION

This invention relates to a single-use syringe of a type which comprises a tubular body wherein a plunger is slidable in sealed relationship, a needle mounted in said tubular body at a first axial end thereof and being movable between a first, safe position and a second, working position whereat said needle is retracted into and extended from said body, respectively, through an opening in the latter, a spring biasing said needle toward its retracted position, said needle being temporarily lockable in its working position.

Re-use of a syringe by many is one of the factors that promotes the spreading of diseases whose infection is passed on by contact with infected blood.

Typical is the spreading of AIDS among people addicted to injectable drugs, where there is a habit of sharing one syringe with several persons.

The most popular of known syringes, while explicitly intended for single use, may nevertheless be used more than once without impairing their mechanical efficiency.

Further, and besides the risk represented by possible re-use thereof, such syringes involve a serious risk of incidental pricking because the needle is left exposed on the tubular body after use of the syringe with no safeguard of sort.

In an effort to obviate such drawbacks, syringes have been developed which incorporate provisions to prevent their re-use and/or a rectractable needle, to thereby eliminate the risks connected with the handling of a used syringe.

Typical examples of such improved syringes are described in US Patents No.s 4,675,005; 4,747,829; 4,692,156; PCT Application

No. WO88/06461; European Patent Application No. 282097; and US Patent No. 4,747,830.

However, it has been found that the engineering of these prior designs results in relatively elaborate constructions, quite unsuited to syringes which may be small in size as are used, in particular, by drug addicts. In addition, some of these syringes can be returned to a working condition after use by relatively simple operations to permit of their re-use.

The problem underlying this invention is to provide a single-use syringe which is structured and operated in such a manner as to first eliminate any problems in handling a used syringe, and secondly, make re-use of the syringe practically impossible.

This problem is solved according to the invention by a syringe as indicated being characterized in that it comprises an expansible retaining member attached to one end of the needle extending inside said tubular body, at least one step defined in said tubular body at a set distance from said first end, wherefore said step is overridden by said retaining member as said needle is moved from said first to the second position, an expander device for the retaining member carried removably on said plunger and adapted to be received and held in a first socket of the retaining member so as to expand it upon the step being overridden and hold the needle in the working position with said retaining member abutted against the step, and a means of dislodging the expander device from the first socket on completion of a working stroke of the plunger so as to disengage the retaining member from the step and release the needle for return to the first position.

The features and advantages of this invention will be more clearly apparent from the following detailed description of a preferred, but not exclusive, embodiment thereof, shown by way of non-limitative example in the accompanying drawings, where:

Figures 1 to 5 are fragmentary sectional views of a syringe embodying this invention, shown at various stages of its operation; and

Figure 6 is a longitudinal section view of a modified embodiment of a detail of the syringe shown in the previous Figures.

Generally indicated at 1, in Figures 1 to 5, is a syringe according to this invention. The syringe 1 comprises a tubular body 2 wherein a plunger 3 is slidable in sealed relationship which is provided, at an axial end thereof, with a piston 4 made of a soft elastomeric material.

A lug 5 extends in axial continuation of the piston 4 and is a unitary construction therewith.

The lug 5 is substantially cylindrical in shape, hollow inside, and carries an annular ridge 6 on its free end which defines a groove accommodating a ring 7 of a stiff plastics removably therein.

An opening 8 is formed at an axial end 2a of the tubular body 2 which widens out, on the side facing inwards of the tubular body, into a socket 9 whose function will be explained hereinafter.

A narrow circumferential groove 10 is formed in the wall of the socket 9.

An annular step 11 is formed on the interior of the tubular body 2 at a set axial distance from the end 2a.

The step 11 bounds two contiguous cylindrical sections inside the tubular body, which have different inside diameters 2c and 2d, respectively.

A hollow needle 12 is supported slidably within the tubular body 2. A tip 13 is defined at one end thereof, and a retaining member, generally indicated at 15, is attached to the other end of the needle.

The retaining member 15 comprises a needle-holding head 20 substantially cylindrical in shape, and a bell 16 formed with longitudinal cuts 17 effective to confer elasticity on the bell, in the radial direction thereof.

Inside the bell 16, there are defined first and second sockets, respectively indicated at 18 and 19, which have different inside diameters.

Either sockets 18, 19 are adapted to accommodate the ring 7, respectively in interference fit and limited radial clearance relationship. The ring 7, when received in the socket 18, behaves as an expander device for the bell 16.

A ring seal 21 is fitted over the bell 16 outside, at a recessed region on the latter. The seal 21 is adapted to make a seal with the inner wall of the tubular body 2 at the section 2d thereof.

A coil spring 22 is interposed to the end 2a of the tubular body 2 and the member 15 to bias the needle 12 toward a first or safe position of retraction inside the tubular body.

Supported in between the turns of the spring 22 is a needle-guiding member 25 which fits slidably over the needle 12 and is adapted to snap into the socket 9 with an annular ridge 26 inserted into the circumferential groove 10.

The thrust force from the spring 22 biases the needle 12 toward a position offset from the axis of the opening 8; however, this bias is resisted before use of the syringe 1 by the needle-guiding member 25.

In its for-sale condition, the syringe would have the configuration shown in Figure 1. To use the syringe, one should move the needle 12 from its safe retracted position inside the tubular body 2 to a second or working position, as shown in Figure 2.

On pushing the plunger 3 toward the end 2a of the tubular body, the retainer 15 will be urged by the piston 4, and specifically by the ring 7 carried on the lug 5, in a direction toward the step 11 against the bias of the spring 22. At the same time, the needle 12 will be brought out through the opening 8.

Because of the interference between the first socket 18 of the bell 16 and the ring 7, the latter will remain, at this stage of preparation of the syringe 1 for use, in its abutted condition against the corresponding end of the bell 16 until the needle-guiding member 25 is pushed into the socket 29 of the head 20 and, simultaneously therewith, the bell 16 contracts radially and moves past the step 11.

By a further push on the plunger 3, the ring 7 is then forced to engage the first socket 38 of the retainer 15, and to be held therein to hold the bell 16 expanded radially.

The syringe 1 is now ready for use (position shown in Figure 2).

By drawing the plunger 3 away from the end 2a, the ring 7 is caused to stay engaged in the first socket 18, thereby the

needle 12 cannot be retracted by the bias applied by the spring 22.

At this stage, a liquid may be drawn into the tubular body, through the needle 12, into the chamber defined between the piston 4 and the seal 21. The syringe 1 will behave like an ordinary fixed needle disposable syringe (Figure 3).

To inject the drawn liquid by a subsequent working stroke of the plunger 3 (Figure 4), the plunger is again pushed in toward the end 2a of the tubular body until the annular ridge 6 of the lug 5 contacts the ring 7 held in the first socket 18 of the retainer.

A further push on the plunger 2 will cause the ring 7 to become dislodged from the socket 18 and move into the socket 19. In view of that the ring 7 is received with some radial clearance in this socket 19, the bell 16, which is still held abutted on the step 11 by the spring 22, is now free to contract.

Thus, on releasing the pressure exerted on the plunger 3, the needle 12 and the retainer 15 associated therewith will be retracted into the first, safe position, out of sight inside the tubular body 2.

Since the needle-guiding member 25 is held back in the socket 9, the needle 12 will be drawn out of it, and being no longer guided, diverted by the thrust component from the spring 22 to an offset position from the axis of the opening 8.

Thus, any further attempts at extending the needle 12 by a push exerted on the plunger 3 would be frustrated.

Figure 6 shows a modified embodiment of the needle-guiding member. In this modified embodiment, which is provided to further enhance the ability to prevent a second extension of

the needle 12 out of the tubular body 2, the needle-guiding member is generally denoted by the numeral 30.

The outward configuration of the member 30 requires that the socket 9 be shaped differently, as may be appreciated by the skilled one in the art, to enable said member 30 to be received therein in matching shape relationship.

The member 30 is through-penetrated by an axial bore 31 and has, on the side facing toward the interior of the tubular body 2, a conical projection 32 extending around the opening of the bore 31.

Defined around the projection 32 is a recess having flared walls 33 effective to catch and hold the tip 13 of the needle 12 after use of the syringe and with the needle fully retracted into the tubular body 2, in the event of any attempt to re-use the syringe 1.

The major advantage of the syringe according to the invention is that it is highly reliable in operation and quite safe for the user. Almost all of its components can be readily manufactured by a molding process from suitable plastics materials, as conventionally used in the manufacture of disposable syringes.

The simple construction also permits of syringes to be manufactured in any sizes at relatively low production costs.

Furthermore, it should be noted that the further push on the plunger required to move the ring 7 into the socket 19, so that the needle can be allowed to move back into its retracted position, is stimulated by that a significant amount of the liquid drawn up into the tubular body would not be injected otherwise. With drugs, the worth of the residual liquid would exceed the cost of the syringe by an appreciable amount.

第 79100210號「一次使用之注射器」專利案
（79年9月修正）

CLAIMS

1. A single-use syringe comprising a tubular body (2) wherein a plunger (3) is slidable in sealed relationship, a needle (12) mounted in said tubular body at a first axial end (2a) thereof and being movable between a first, safe position and a second, working position whereat said needle is retracted into and extended from said body (2), respectively, through an opening (8) of the latter, a spring (22) biasing said needle (12) toward its retracted position, said needle being temporarily lockable in its working position, characterized in that it comprises an expansible retaining member (15) attached to one end of the needle (12) extending inside said tubular body, at least one step (11) defined in said tubular body at a set distance from said first end (2a), wherefore said step is overridden by said retaining member as said needle is moved from the first to the second position, an expander device (7) for the retaining member carried removably on said plunger (3) and adapted to be received and held in a first socket (18) of the retaining member (15) so as to expand it upon the step (11) being overridden and hold the needle in the working position with said retaining member abutted against the step, and a means (5,6) of dislodging the expander device from the first socket on completion of a working stroke of the plunger so as to disengage the retaining member from the step and release the needle for return to the first position.

2. A syringe according to Claim 1, wherein said retaining member (15) comprises a bell (16) open to said plunger (3) and having said first socket (18) and a second

socket (19) defined therein, said second socket being configured to accommodate said expander device (7) as dislodged from the first socket and permit of the elastic return of the retaining member.

3. A syringe according to Claim 2, wherein said bell is formed with longitudinal cuts (17).

4. A syringe according to claim 1, wherein said expander device for the retaining member comprises a ring (7) held removably on a plunger lug (5).

5. A syringe according to Claim 4, wherein said means (5,6) for dislodging the expander device from the first socket (18) comprises said plunger lug.

6. A syringe according to either Claim 4, wherein said lug (5) has a substantially cylindrical shape and is provided with an annular ridge (6) adapted to hold back said ring (7) until it is received in said first socket (18), and therefore, to form said means of dislodging the expander device.

7. A syringe according to Claim 1, wherein a needle-guiding member (25,30) is arranged to be pushed into engagement with and held in a socket (9) formed at the first end (2a) of the tubular body (2).

8. A syringe according to Claim 7, wherein said spring (22) is a coil spring, and that said needle-guiding member (25,30) is held in the turns of said spring prior to being received in the corresponding socket (9), thereby aligning said needle to the opening (8) in said first end of the tubular body.

9. A syringe according to Claim 7, wherein the needle-guiding member (30) has, on its side facing

the retaining member (15), a conical profile shape (32).

10. A syringe according to Claim 1, wherein the needle (12), stroke of the plunger (3), is offeset from the opening d (8) of the in its retracted inside the tubular body (2) the following a working tubular body

11. A Syringe according to Claim 7,8 or 9, wherein the needle (12), in its retracted condition inside the tubular body (2) following a working stroke of the plunger (3), is disengaged from the needle-guiding member (25,30) and offset from the opening (9) of the tubular body.

12. A syringe according to Claim 1, wherein the retaining member (15) is engaged in said tubular body (2) in sealed relationship therewith.

13. A syringe according to Claim 4,5, or 6, wherein said lug (5) is a unitary construction with a piston (4) of the plunger (3).

14. A syringe according to Claim 7,8 or 9 wherein the retaining member comprises a head (20) adapted to push the needle-guiding member (25,30) into the corresponding socket (9) with the needle (12) in its second position.

ABSTRACT

A single-use syringe is disclosed which comprises a tubular body (2) having a plunger (3) slidable inside it in sealed relationship, a needle (12) movable between a first, safe position and a second, working position, respectively retracted into and extended from the body (2), through an opening (8) of the latter, and a spring (22) biasing the needle (12) toward its retracted position. To temporarily lock the needle in the working position, the syringe further comprises an expansible retaining member (15) attached to one end of the needle (12), at least one step (11) defined in the tubular body at such a distance away as to let the step be overridden by the retaining member as the needle is moved from the first to the second position, an expander device (7) for the retaining member carried removably on the plunger (3) and adapted to be received and held in a first socket (18) of the retaining member (15) to expand it following the step (11) overriding and hold the needle in the working position, and a means (5,6) of dislodging the expander device from the first socket to disengage the retaining member from the step and release the needle for return to its first position.